

## GEMS Viewer Design:

### Characteristics:

- ✓ capacity of 1024 GEMS in a "CAROUSEL" storage rack.
- ✓ automatic storage & retrieval <sup>to and</sup> from viewer to 'carousel'
- ✓ 3 seconds access time to any GEM (nominal time)
- ✓ viewer - split field, binocular microscope  
one side for GEM - other side for material
- ✓ DefRotation - Image alignment in both fields
- ✓ will handle  $\leq 9\frac{1}{2}$ " film material
- ✓ will handle O/N with "No touch" & automatic threading
- ✓ Focus control
- ✓ Zoom 6X - 60X with two objectives
  - [ # one objective 6X - 25X ]
  - [ # Two " 15X - 60X ]
- ✓ ~~Course~~ <sup>SLEW</sup> & fine X-Y position control

Declass Review by NIMA/DOD

# OPERATION

#1. SET-UP (MATCH illumination  
in both open GATES)

#2. LOAD (FILM TO be EVALUATED)

#3. Select 1<sup>ST</sup> TGT

#4. MATCH GEM:

(a) scene content

(b) density

(c) contrast

(d) MTF

(e) call-up  
(repeat as necessary)

#5. Record MATCH  
CARD?

paper type?

SCENE CONTENT	NET DENSITY	CONTRAST	MTF
CITY	1 (h.g.H)	1 (h.g.H)	1 (h.g.H)
A/F	2	2	2
IND	3	3	3
harbor	4 (Low)	4	4
		5	5
CALL-UP		6	6
RECORD		7	7
CLEAR		8 Low	8 Low

Unresolved Question: Type & content of recorded data  
eg. frame # ?  
x-ray location ?  
etc ?

STATUS ON PSYCHOPHYSICAL STUDY

(Sub-task of Gems-Continuing Study)

STATINTL

Beginning with the acquisition of security clearances for [ ] personnel, requirements of the Psychophysical study have been examined by reviewing photographic imagery and related data at the customer's facility and by conferring with [ ] on two occasions. This review has lead to a recommended course of action jointly agreed upon by [ ] of this status report is to describe the recommended course of action and to request such comments and/or alterations as the customer may wish to make.

STATINTL

STATINTL  
The purpose

The recommendations made herein are concerned with the description of the stimulus material (Gems) that should be prepared and the manner in which they are to be used.

DESCRIPTION OF GEMS

It is recommended that the Gems prepared from Psychophysical Study be tailored to the characteristics of the [ ] system. These Gems will be *neg.*ve transparencies having the following characteristics:

Scale Factor: 1:336,000

Film Type: EK 3404

Processing: CASCADING OF INT. NEG & STD. POSITIVE

Solar Elevation: 30°-35°

Angle of View: 15° FWD OR AFT, ±12° PORT OR STBD

Scene Content: THREE SCENES MIN, FOUR MAX.  
TO INCLUDE - INDUSTRIAL, AIRFIELD,  
HARBOR.

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For each scene that is selected, a matrix will be constructed having the dimensions of Modulation Transfer Function and exposure. The MTF axis will provide a progression in ground resolution from better than nine feet to worse than 18 feet. The exposure axis will vary above and below normal exposure in a manner that is to be determined empirically. In determining the spacing along the exposure axis of these positive Gems, we shall introduce a compensated printing of the negative Gems. This compensated printing will in effect reduce the apparent changes in exposure just as is the practice in the processing of operational material.

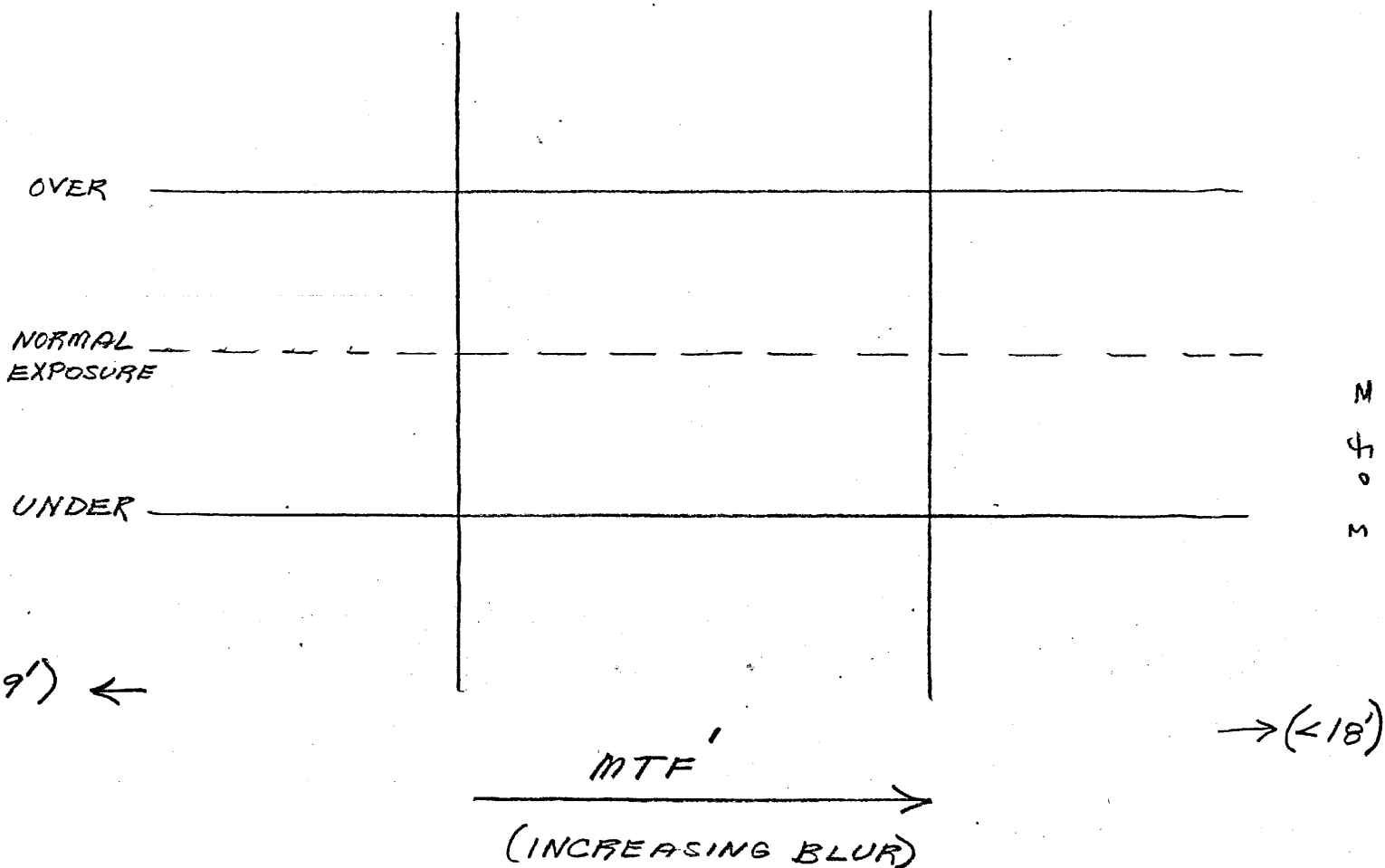
#### SOURCE MATERIAL

In reviewing the available material from which Gems may be generated, it has been decided that flight test photography from the system would be the most appropriate material. The customers cooperation in the selection of suitable images from this material is requested.

#### MANNER OF USE

The first positive Gems prepared for this study shall consist in an array described in Figure I. By use of these Gems, equal increments of image quality shall be established and thereafter a more complete Gems matrix will be provided. This complete Gems matrix will be employed to determine the feasibility of assessing the photographic image quality of an operational system via comparative photography.

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1 APPROX. GAUSSIAN IN SHAPE

FIG. 1 - GEMS MATRIX (PARTIAL)

## CONTENT OF MONTHLY REPORT

STATINTL

- (a) CONTRACTOR:
- (b) Project Title: GEMS Development (Continuation)
- (c) Objective of Project:  
(Brief narrative statement)

STATINTL

- (d) Customer's Project #: 99740-6  
(e) contract # [redacted]; task # 8; dated 5 January 1966  
(f) type of contract: CPFF  
(g) total contract price: [redacted]  
(h) scheduled completion date: 30 June 1967  
(i) Monthly Report # \_\_\_\_\_; date of report: \_\_\_\_\_  
(j) reporting period: \_\_\_\_\_ to \_\_\_\_\_  
(k) percent of total funds expended: \_\_\_\_\_% as of \_\_\_\_\_.  
(l) percent of work completed: \_\_\_\_\_% as of \_\_\_\_\_.  
(m) Work completed during reporting period and status of overall project:  
(Brief narrative statements)

STATINTL

- (n) Difficulties encountered (if any): (Brief narrative statements)
- (o) Planned Work for next period: (Brief narrative statements)
- (p) Description of technical agreements made with Government Representative (if any): (Brief narrative statements)